

Chapter III

THE LOUISIANA AND TEXAS INTRACOASTAL WATERWAY

The Louisiana and Texas coastlines were not even considered in congressional planning for an inland canal tying together the Gulf and Atlantic waterways until almost the last quarter of the nineteenth century. Fifty years earlier, when the first appropriation was made to improve Pass au Heron, the Mexican flag flew over Texas. This state, with its vast expanses of land and enormous resources, was admitted to the Union in 1845. Louisiana had gained statehood in 1812 and enjoyed the tremendous geographic advantage of its location on the Mississippi River as well as the benefits of 4,000 miles of natural waterways. The fact that no survey was authorized for the intracoastal waterway west of the Mississippi River until 1873 is striking. Also striking is the fact that the first appropriation made for the western leg of the intracoastal waterway and, indeed, the only appropriation made during the century for a stretch of inland canal along the entire Gulf Coast was designated for Texas.¹ Ironically, the intracoastal waterway west of the Mississippi was conceived many years after its eastern counterpart but, once underway, moved somewhat more swiftly toward the accomplishment of a continuous waterway.

A LOOK TO THE WEST

The first step toward creation of the western inland waterway was taken when the Rivers and Harbors Act of March 3, 1873 provided an appropriation "not to exceed twenty thousand dollars" to conduct a survey "For connecting the inland waters along the margin of the Gulf of Mexico, from Donaldsonville, in Louisiana, to the Rio Grande river, in Texas, by cuts and canals." From his post in the United States Engineer Office at New Orleans, Captain Charles W. Howell delegated the field chores to three civilian engineers. The Louisiana segment was divided between J. A. Hayward, who began working westward from the Mississippi River on December 6, 1873, and H. C. Ripley, who in February of the following year began working eastward from Sabine Lake. The two survey parties met at a point midway between Vermilion Bay and White Lake, concluded their field work on June 6, and then returned to New Orleans to plot their work. Hayward and Ripley found their levels only differed by one-tenth of a foot, considered by Howell "gratifying evidence of the correctness of their work."²

The formidable task of surveying the entire Texas coast was assigned to Assistant Engineer James S. Polhemus. With a party of three men, he ran his transit line a distance of 50 miles from East Galveston Bay to Sabine Lake between January 23 and April 1, 1873. (Curiously, the survey appears to have begun before passage of its authorizing legislation.) Characterize by an average elevation of 2 feet, this territory led them through marshy swamplands, infested with "clouds of mosquitoes" and covered with a "dense growth of sea-cane." The remainder of the Texas coast, from West Galveston Bay to the Rio

Grande, was surveyed between November 20, 1873 and August 1, 1874. Accompanied by one assistant and four men, Polhemus measured 242 miles as the East Texas swampland gradually gave way to "wide and shallow bays, along a wild and almost uninhabited coast."³

Two stretches along their route in Texas had been altered by man about twenty years earlier. The Galveston and Brazes Canal, connecting the waters of West Galveston Bay and the Brazes River, remained navigable with depths ranging from 3 to 6 feet. Further down the coast, a stream known as Caney Creek, which at one time emptied into the Gulf, had been rechanneled into Matagorda Bay by a 2,850-foot-long ditch. The outlet to the Gulf disappeared and the small ditch gradually enlarged to dimensions of 15 by 80 feet, earning for itself the name of "The Big Canal." Polhemus and his party also traversed several "cuts" connecting bays along the 77 miles between Indianola on Matagorda Bay and Corpus Christi.⁴

Howell based his survey report, dated 1875, upon the extensive fieldwork of these "young gentlemen," who "suffered hardships rarely met in the line of their profession." He explained the guiding principle in selecting the route for the proposed 6-by-60-foot canal:

to utilize the navigable bayous, lakes, bays, and sounds or lagoons, near the coast, and make the cuts connecting them along the shortest lines available.

In this report, Howell presented the first plan for an inland waterway beginning at the Mississippi River and terminating at the Rio Grande where he deemed necessary a lock with a double gate and 5-foot lift.⁵

The eastern terminus of the proposed waterway to be surveyed was Donaldsonville, located 25 miles south of Baton Rouge where Bayou Lafourche joined the Mississippi River. Howell astutely pointed out that if commercial traffic between the Mississippi River and the Rio Grande were to justify developing an inland waterway, more elaborate surveys might suggest an initial point on the Mississippi below Donaldsonville. Perpetually plagued by funding problems, he had prefaced his report by stating the work had been performed under a "scant appropriation" so that some parts of the survey "only reached the dignity of a reconnaissance."⁶

Howell designated the section from Donaldsonville to the head of Vermilion Bay as the most important commercially, offering southern Louisiana a water connection with the Mississippi River that would replace the long or obstructed routes available during only certain seasons of the year through the Atchafalaya and Lafourche or the outside Gulf route. He noted the southeastern Louisiana parishes that would be served by this section of the proposed waterway covered some of the most fertile agricultural land in the state and contained much good timber. At the point where the Mississippi River and Bayou Lafourche converged, the bayou was to be closed to permit its dredging. A connection could be maintained either by a lock, by inclined planes over which vessels might be transferred between river

and bayou, or by transfer of freight across the levee. Howell preferred the clearly less expensive third alternative involving a solid dam across the head of the bayou.⁷

The proposed route descended Bayou Lafourche from Donaldsonville to Napoleonville, then proceeded through a new canal to Lake Verret and on through Bayou Long and Flat Lake to Brashear (Morgan) City. West of Morgan City, in keeping with the congressional requirement to utilize navigable bodies of water near the coast, the recommended route continued coastward through the Lower Atchafalaya River and along the coast through Atchafalaya, Cote Blanche, and Vermilion bays. Howell found this route deficient because the wide shallow bays, subject to storms from the south, would not afford truly protected inland navigation for ordinary river steamboats and coal boats. Preferring a more inland course, Howell proposed two alternative routes via Bayou Teche and dredged cuts to reach Vermilion Bay.⁸

Howell justified the section between Vermilion Bay and Galveston more on the basis of potential than on existing commerce. An inland channel along this stretch would connect the Mermentau, Calcasieu, Sabine, and Neches rivers with the Mississippi and Galveston seaports. Howell predicted considerable lumber movement westward, great development of sugarcane production due to reduced coal costs in the sugar distillation process, improved transport of cotton to market, and enhanced development of the Calcasieu sulphur mines. The route surveyed lay no more than a few inches above tidewater and incorporated Vermilion Bay and White, Grand, Calcasieu, and Sabine lakes, believed by Howell to have been formerly connected by natural passes that were 'gradually obliterated by the action of the Gulf tides.' Expecting the same causes that destroyed the original passes to fill in excavated cuts, he anticipated maintenance costs would be high. In addition, the reach extending west of Calcasieu Lake posed another problem. This swampy territory, described by surveyor Ripley as terre tremblante, consisted of a soft mud foundation covered by the matted roots of a heavy, 5-foot-high growth of "broad-bladed, three-edged grass." Ripley noted a slight agitation of this matted surface could be felt several feet away. To counteract the unstable character of what Ripley called the "trembling prairie," Howell proposed depositing material excavated from the cuts at some distance from their sides. This, of course, would entail greater cost.⁹

The prospects of dredging an inglorious ditch through an often desolate, 725-mile stretch of sand and swampland did not fire the imagination or loosen the purse strings of Congress. This western two-thirds of the future GIWW fared little better than the one-third east of the Mississippi River during the last quarter of the nineteenth century. The vision was there, but the time was not right. Renewed interest in this waterway would have to wait another thirty years for stimulation from a growing population, the discovery of oil, and more vocal rumblings from the local captains of industry.¹⁰ The only improvement made during this time was on an isolated stretch several hundred miles west of the mighty Mississippi.

The first segment of canal improved by the federal government lay in West Galveston Bay, Texas. The state had dredged a channel 5 feet deep across obstructing reefs in 1859, but this passage had deteriorated drastically after the cyclone of 1875 and sustained still more damage from a severe storm in 1886. In 1892, Congress authorized a project for enlarging and straightening the channel to afford depths of 3 to 3.5 feet and widths of 100 to 200 feet. Dredging was begun under contract on January 19, 1893 and completed October 2, 1895. The improvement terminated at Christmas (also called Christian's) Point in Oyster (also called Christmas) Bay.¹¹

Next, attention shifted immediately southwestward to the canal of the Galveston and Brazes Navigation Company. This n-mile-long stretch represented the only obstruction to a federally improved, continuous channel between Galveston and the Brazes River. Tolls levied on the river steamboats carrying cotton to market, fishing schooners, and other small craft rendered the canal ineligible for improvement by the federal government. Recognizing the value of this route as an alternative to the troublesome bar at the mouth of the Brazes River, Army Engineer Major Oswald H. Ernest had raised the possibility of acquiring the canal in 1887. Nine years later, his successor in the Galveston Engineer Office, Major Alexander M. Miller, recommended making this purchase. On February 11, 1897, the navigation company offered the canal to the government for \$50,000. Congress authorized the purchase at \$30,000 and the transaction was completed in December, 1902, providing an improved federal channel from West Galveston Bay to the Brazes River. Meanwhile, in 1900, Army Engineers reported their surveys and examinations of certain "adjacent streams"--Caney Creek, the San Bernard River, and Oyster Creek--with a view toward incorporating them into a network of protected waterways.¹²

ROUND TWO

Slowly but steadily the idea of an inland navigation system was taking hold. Several factors significantly boosted the impetus for the waterway along the Gulf Coast during the first decade of the twentieth century. An event on a salt dome south of Beaumont, Texas dramatically altered the region's economy and greatly influenced development along its waterways. For several years, test drilling had been conducted at the Spindletop oil field. On January 10, 1901, a well blew in with a spectacular gusher, which ran wild for several days before being capped. The birth of the Texas petroleum industry ushered in a new future for the navigable waters along the Gulf Coast.¹³ Also, the new century produced a ground swell of public support for waterway improvement from which emerged a comprehensive national policy by the end of the decade.

Amidst the spin-off from this policy-making process came authorization on March 3, 1905 for the first in a second round of surveys, this one for the "Louisiana and Texas Inland Waterway." Major (later Lieutenant General) Edgar Jadwin, from his post as

District Engineer in the Galveston Engineer Office, reported on the renewed Louisiana and Texas waterway studies late in 1906. This distinguished Army Engineer, an alumnus of the Panama Canal construction who would later become Chief of Engineers and sponsor of the Mississippi River flood-control plan adopted by Congress in 1928, retraced the steps of the 1873 survey, finding a considerable portion of Howell's report still applicable. Jadwin's examination included two additional surveys: one from Aransas Pass through Turtle Cove to Corpus Christi and the other from Aransas Pass to and up the Guadalupe River. His assessment of potential commerce for the proposed Mississippi River-to-Rio Grande waterway included coal, rice, oil, sugar and molasses, lumber, cotton, and general merchandise.

One development since Howell's time influenced Jadwin's thinking in regard to the point at which the inland canal and the Mississippi River should be joined. A project adopted in 1888 provided for dredging a channel and constructing a lock to connect Bayou Plaquemine and the Mississippi River. This project would afford through passage for boats from Bayou Teche and the Atchafalaya River via Bayou Plaquemine and the Mississippi River to New Orleans. Rather than joining the inland waterway to the Mississippi River at Donaldsonville and utilizing Bayou Lafourche as Howell had been instructed, Jadwin proposed taking advantage of the Plaquemine improvements. His proposal would have been advantageous for nearby Baton Rouge but offered little appeal to New Orleans, 100 miles downriver from the Plaquemine Lock.¹⁵ By 1909, the Plaquemine Lock was completed, but a special board of engineers responsible for the entire Gulf Coast section of the extensive set of surveys authorized in 1909 left little doubt that New Orleans should indeed become the site where the inland canal and the Mississippi River should come together. The board's report, published in 1914, explained:

Both economy of construction and saving of time in movement of freight make desirable a waterway as nearly direct as can be obtained; it should preferably join the Mississippi River as near the business portion of the city of New Orleans as practicable.

The recommended terminus lay at Harvey, Louisiana (just across the river from New Orleans), to be reached by a number of possible routes involving privately constructed canals. The Harvey Canal would place the point of entrance to the Mississippi nearer the business center of New Orleans, while that of the Company Canal joined the river about 4 miles upstream and would be that much more advantageous for traffic to points above the city.¹⁶

During the first decade of the century while the eastern terminus of the canal remained indefinite, a start was made on the canal's midsection. Jadwin's report in 1906 had anticipated a heavy water-freight traffic in the region between Franklin on Bayou Teche to the Vermilion River and on to Lake Misere, west of the Mermentau River. The region contained two large salt mines and was the meeting ground of the rice and sugar areas of the state; its western portion bordered the largest rice section in Louisiana. Prospective commerce

also included extensive outputs of oil and lumber. The Army Engineers concluded the inland waterway between Franklin and the Mermentau River was worthy of improvement and Congress appropriated an initial \$89,292 in the Rivers and Harbors Act of March 2, 1907. The Rivers and Harbors Act of June 25, 1910 appropriated \$100,000 to improve the adjacent western reach from Mermentau River to Sabine River. Congress authorized the final segment of this 5-by-40-foot canal in Louisiana, from the Mississippi River west to Bayou Teche, in 1919, incorporating the Harvey Canal-Lake Salvador route recommended by the Engineers five years earlier. By 1922, cargoes totaling 171,000 tons were transported on the existing channels of this eastern segment between Bayou Teche and New Orleans even though the federal improvements had not yet been accomplished.¹⁷

At the Texas end of the line, Jadwin's surveys of 1905-06 gave rise to more fragmented legislation, providing only for 5-by-40-foot channels from Corps Christi to Aransas Pass, from Aransas Pass to Pass Cavallo, and from the Brazes River to West Galveston Bay, all dredged by 1909. Also, legislation authorized a tributary channel up the Guadalupe River to Victoria. Jadwin advised reconsidering the southwestern extremity from Corpus Christi to Point Isabel at a future date.¹⁸

In 1908, reexamination of Jadwin's report focused on the unimproved segment between the Brazes River and Matagorda Bay. This review prompted Gulf Division Engineer Lieutenant Colonel (later Major General) Lansing H. Beach, a future Chief of Engineers, to make a statement that seems to reflect a shift toward a more flexible approach:

Even should local conditions not be such as to demand the improvement of this portion of the inland waterways, . . . the fact that it is one link in the chain of waterways paralleling the shore of the gulf is of sufficient importance to cause the improvement to be made at as early a date as possible.¹⁹

Congress authorized improvement of this segment in 1910, thereby clearing the way for an uninterrupted channel from Galveston to Corpus Christi. Still, despite the more embracing national policy explicitly underscored by the Rivers and Harbors Act of 1909, which ordered surveys for a 'continuous waterway' from Boston to the Rio Grande, appropriations did not keep pace with the enthusiastic spirit endorsing this enormous project. As late as 1924, the Board of Engineers for Rivers and Harbors admitted that "No complete project . . . exists for the proposed waterway as a whole, nor for any improvement in the stretch between Port Arthur and Galveston Bay." ²⁰

THE 7-MILLION-TON JUSTIFICATION

"Round three," as it were, followed the interruption of World War I. Although diverting appropriations from civil to military undertakings, the war had also pointed up the value of water

transportation. Another far-reaching survey was authorized on March 3, 1923, designating the region "from the Mississippi River at or near New Orleans . . . to Corpus Christi" as the locale to be studied for the intracoastal waterway. The Engineers now pleaded for a continuous waterway, observing that the ports from Mobile to Galveston that would thus be connected were handling an annual commerce of nearly \$2 billion.²¹ Actually, two issues were involved, one dealing with the continuity and length of the inland canal and the other with its dimensions.

By 1923, the Corps of Engineers was not the only group taking exception to the manner in which the Louisiana and Texas Intracoastal Waterway was being strung together. Eastern steel and iron products enjoyed great demand in Texas oil fields and Texas industrialists were eager to enhance their booming economy by transporting these products at the reduced water rates. The disconnected links placed along the coastline bore little resemblance to the continuous waterway chain so eagerly sought. The fragmented congressional action that seemed to many to be stifling incipient economic development vexed many business and political leaders in the burgeoning industrial cities along the Gulf Coast. Frustration was reaching a feverish pitch. Sensing that the canal's time had come, the Interstate Inland Waterway League prepared to strike.

The canal association's origin dated back to 1905. Early that summer, announcements appeared in local newspapers throughout Louisiana and Texas calling for a convention to discuss "the feasibility, plans and final construction on an intercostal canal from Brownsville, Texas, to Donaldsonville, La., and for the special purpose of organizing an intercostal canal league." The announcement, signed Very respectfully, C. S. E. Holland, President, Business Men's Association, Victoria, Texas," stressed the advantages to be derived from construction of the proposed canal as compared to a railroad at "a ratio of about 20 to 1." Holland urged "every board of trade, chamber of commerce and business men's organization" in both states to send delegates to the convention.²² This appeal, emanating from a cowtown remarkable mainly for its obscurity, set in motion the formation of an association that has endured to the present day.

The convention called by Clarence Holland, a Victoria banker, gave birth to the Interstate Inland Waterway League on August 8, 1905. A yellow fever epidemic prevented the participation of interested parties from Louisiana, but newspaper accounts of the day indicate that "what is lacking in attendance is more than made up in enthusiasm and the prominence of the delegates."²³ Despite the absence of Louisiana representation, more than 200 Texas delegates including congressmen, judges, and prominent businessmen assembled in the Victoria opera house and laid the foundations for a permanent organization.²⁴ These far-sighted men recognized the potential value of an inland waterway to the economy of a region extending many miles beyond their respective locales.

The new league reconvened a year later in Lake Charles, Louisiana, and the following year (1907) in Houston. At that time, a dynamic young man named Roy Miller became the "active" vice president of the organization. Only a few years out of college, Miller had worked briefly as a junior reporter for the Houston Post and then moved to South Texas to serve as advertising agent for the St. Louis, Brownsville & Mexico Railway. In his capacity as an advance man for the railroad, which was then being extended toward Brownsville, Miller became well acquainted with civic leaders in the various coastal communities. If Clarence Holland provided the inspiration for the association, Roy Miller furnished the perspiration. Miller energetically launched its activities and spearhead its program, becoming a persuasive advocate of the canal and devoting his capable leadership to this cause for the remaining forty years of his life.²⁵

During the early years of the league's existence, Roy Miller scored some modest successes in selling the inland canal to Congress. By securing needed rights-of-way from local interests, the organization facilitated passage of the 1910 legislation providing for the Mermentau-to-Sabine River segment; nevertheless, Congress continued to parcel out authorization for the 5-by-40-foot channel segments in piecemeal fashion. Meanwhile, industrial development mushroomed along the Gulf Coast and deep-water ports proliferated. Miller was instrumental in obtaining appropriations for the port facility at Corpus Christi and served a five-year stint as the city's "boy mayor" during the war years. His legislative efforts on behalf of the Texas Gulf Sulphur Company led to improvement of the reach between Galveston and Matagorda Bay, facilitating movement of a large volume of tonnage destined for export from the island port.²⁶

"The Intra-Coastal Canal will put Houston on the Mississippi river," declared Miller as he moved the association office to that city in March, 1923. At that time, a 9-foot depth prevailed on the Mississippi River between New Orleans and St. Louis and on the Ohio River between Cairn and Pittsburgh. Pushing for a continuous waterway with a comparable depth along the Gulf Coast, Miller envisioned traffic through 6,627 miles to connect points along this coast with such distant ports as Minneapolis, St. Paul, and Birmingham.² The March 23 Galveston Daily News reported his reaction to announcement of the new federal survey:

According to Mr. Miller, this is the first time the association has been able to get the government to act on the canal as a whole. Heretofore, it has been considered section by section.
• .O After the preliminary survey, a report will be made as to whether a commercial necessity exists for the waterway.

Miller was not content to leave the commercial case for the waterway to chance. Leaders of his organization, now renamed the Intracoastal Canal Association of Louisiana and Texas approached Major General George W. Goethals and asked him to recommend a bright young engineer to study the commercial potential of a continuous canal through Louisiana and Texas. The retired Army Engineer, whose name

was synonymous with accomplishment of the Panama Canal, had a more-than-passing interest in the proposed canal; his consulting firm had recently supervised construction of the Inner Harbor Navigation Canal Lock at New Orleans. When he met with the canal association officials the next morning, Goethals declared, "I believe I will take that job myself." Announcing Goethals's retention by the association, the July 5 Beaumont Enterprise described this "move" as a "master stroke" and predicted that "Employment of General Goethals will have a very impressive bearing on the canal's future."²⁹

While Goethals conducted his investigation, Miller raced up and down the Louisiana and Texas coastline, flamboyantly garnering support for the proposed project and leaving a flurry of stirring pronouncements in his wake. "Sell It" Says Miller," reported the New Orleans States on July 18, 1923. Miller had been in New Orleans to raise \$30,000 for a three-year campaign to promote the canal project between the Mississippi River and Corpus Christi. The newspaper reproduced a portion of his effective oratory:

The transportation demands of this country increase 100 per cent every ten years. Railroads have not increased their facilities a particle during the past 10 years. . . . What we are here today for is to sell the intracoastal canal project to the people of Louisiana and Texas. Make 'em buy it; it's the best investment I know. The real job before us is to work up public sentiment to back up this project before Congress. . . . Let's strike.³⁰

In his report submitted on November 27, 1923, Goethals estimated the present tonnage possibilities of the combined Louisiana-Texas inland waterway between 5 million and 7 million tons annually, indicating, "this statement is conservative." He rejected the aggregate 12,315,953 tons compiled in the statistics for 1922 because of duplication, but he did conclude his report by stating:

With the maintenance of a 9-foot channel in the Mississippi River; with the completion of the Ohio River improvement; and with the enlargement of the Chicago-Mississippi Canal, the tonnage possibilities of the canal will exceed the 12,000,000 tons annually, which in the early part of this report are mentioned but not accepted, and the intracoastal canal will become a vital part of the great inland waterway system of the country.³¹

The Army Engineers estimated construction costs for the waterway from New Orleans to Corpus Christi at \$16 million. On March 3, 1925, Congress appropriated the lesser sum of \$9 million for a 9-by-100-foot intracoastal waterway to extend only as far as Galveston. Learning of the departure from the original proposal to Corpus Christi, Roy Miller, with his penchant for pithy phrases, declared, "I am not satisfied, but gratified. Indeed, despite its shortcomings, this piece of legislation finally provided for the long-awaited continuity as well as for enlarged project dimensions.

The Rivers and Harbors Act of 1925 also authorized preliminary examinations and surveys to the east, from New Orleans to the Apalachicola River in Florida, for an inland waterway deep enough to accommodate self-propelled barges. Authorization in 1927 further extended continuous inland navigation along the Texas Coast as far west as Corpus Christi, and provided for the larger project dimensions throughout. The Plaquemine waterway to Morgan City offered an expedient Mississippi River outlet while the Harvey Lock and existing 5-by-40-foot waterway from New Orleans were being enlarged. Direct access between New Orleans and Texas was achieved in 1934 when the segment between the Sabine River and Galveston Bay, was completed, uniting the Louisiana and Texas portions of the waterway, and the new Harvey Lock was opened to navigation.³³

Another development in June of 1923 carried profound implications for the route of the future intracoastal canal. In proposing the course of the channel from Sabine to Galveston, Gulf Division Engineer Colonel George M. Hoffman departed from the earlier principle of dredging through the open bays. He defended the notion of a landlocked channel, to run along and inside the shoreline, stating:

This route while a little longer and requiring more excavation will cost less for maintenance than other routes previously proposed through the bays. . . . Experience has demonstrated the difficulty and cost of maintaining the entrance of a canal into a large bay, especially where this entrance lies across the normal currents of the bay. . . . Boats using this route will be less exposed to storm conditions in the open bay. . . .

This change in philosophy led to the eventual relocation of many older channels as the project for the 9-foot channel terminating at Corpus Christi was pushed forward to its completion in 1942.³⁵

As work on the main channel progressed, the desirability of constructing certain tributary channels became apparent. Branch channels by which cargoes could travel directly to terminals farther inland would enhance the advantages afforded by the growing intracoastal waterway. In 1938, Congress authorized feeder channels up the San Bernard and Colorado rivers plus channels to Palacios, Rockport, and the town of Aransas Pass. By that time, the nature of the commerce evidenced considerable change. petroleum, petroleum products, iron, and steel constituted the bulk of the traffic, displacing the agricultural commodities for which the canal had been envisioned originally.³⁶

The spirit of the Texas frontier prevailed on the San Bernard River for some time after completion of the tributary channel. Occasionally, towboats moving too quickly or carelessly along the channel would scrape the banks with the barges they pulled. Viewing this as a threat to their property, individual property owners along the channel resorted to stationing themselves on the banks, armed with rifles, to keep the towboat captains in line. Several incidents occurred in which the irate landowners literally took potshots at the recalcitrant navigators.³⁷

The 9-foot project, authorized in 1925, provided for construction of locks or guard locks where necessary. Two Texas rivers of sufficient magnitude to cause problems intersected the waterway. At the Brazes and Colorado river crossings, the intracoastal waterway was subjected to large intrusions of sediment that washed down the rivers during periods of high discharge and to excessive currents when the river stages rose. Funds for the necessary protective structures did not become available until the 1942 fiscal year. The Brazes River floodgates were completed in 1943, followed within the next year by the Colorado River floodgates.³⁸

Next, Army Engineers working in the Galveston District conducted studies to determine the advisability of converting the floodgates into locks. At the Brazes River crossing, the velocity of the river flowing toward the Gulf posed the major threat to navigation. But while these currents often caused restrictions to be placed on traffic at this point, the Brazes floodgates did not require as frequent or as prolonged closure as did those at the Colorado River.³⁹

For many years, the Colorado River has been plagued by an enormous log raft, about 25 miles long, in the vicinity of Bay City. Between 1925 and 1929, Matagorda and Wharton counties broke up this obstruction to obtain relief from severe flooding upstream. River currents carried debris from the raft downstream, where it soon formed a massive delta in Matagorda Bay and created a new flood hazard to the lands adjacent to the intracoastal waterway. To alleviate this problem, the Matagorda County Conservation and Reclamation District No. 1 in the mid-1930's dredged a channel across the bay and across Matagorda peninsula, furnishing the river an outlet to the Gulf about 7 miles away. Maintenance of this channel as a flood discharge channel was incorporated into the intracoastal canal project in 1937; however, this channel did not offer a definitive solution to the problems created by the Colorado River. When floods swelled the river, its flow still remained partially confined and the water level in the river would rise as much as 12 feet above mean low tide at its crossing with the canal. Because of this troublesome head differential, the Corps of Engineers concluded that lock structures at the Colorado River must become essential features of any plan to minimize delays to navigation on the waterway. Between the early 1950s and 1957, the Engineers converted the Colorado River floodgates into locks.⁴⁰

All of the remaining locks on the GIWW are located in Louisiana.⁴¹ Those at Algiers, Harvey, and Port Allen overcome the differences in elevation between the water in the Mississippi River and that in the adjacent GIWW. The lock in the Inner Harbor Navigation Canal at New Orleans serves this purpose between the river water level and that in the canal. Locks at Bayou Boeuf and Bayou Sorrel overcome elevation differences between the Atchafalaya Basin Floodway and the main and alternate routes of the intracoastal canal.

Other locks in Louisiana prevent intrusion of salt water into the waterway. Operated in concert, the Vermilion and Calcasieu locks protect a large freshwater reservoir used largely for rice irrigation in the adjacent wetlands. The lock at Freshwater Bayou was also constructed to prevent saltwater intrusion from the Gulf.

THE CRUCIAL CONNECTION

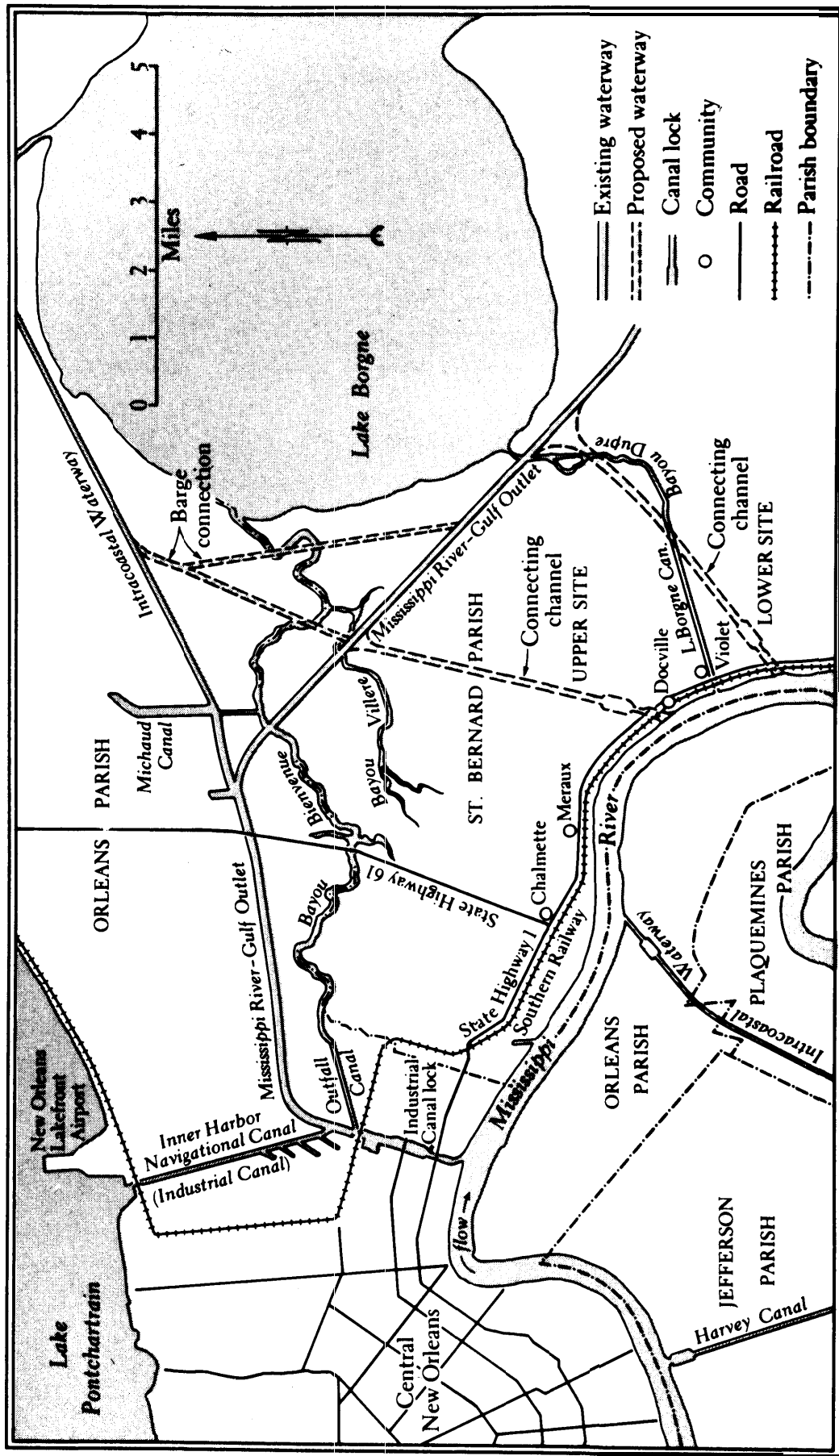
Exigencies of wartime hastened the next significant step in the growth of the main channel. Under the plea of national defense, Congress authorized enlargement of the entire waterway and its extension from its eastern terminus at Apalachee Bay in Florida to "the vicinity of the Mexican border." The Second Supplemental National Defense Appropriation Act of October 26, 1942 funded the work, which was prosecuted with such dispatch that by 1945 a continuous waterway with minimum dimensions of 12 by 125 feet extended from Carrabelle to Corpus Christi.⁴²

The 1942 legislation provided not only for the western extremity of the inland waterway but also for an improved connection of its eastern and western halves. During the 1930s, as the main channels on either side of the Mississippi River were being joined into continuous thoroughfares, no "federal channel" connected the two. Westbound barges passing through Lake Pontchartrain arrived at the state-owned Inner Harbor Navigation Canal. To reach the Mississippi River, they had to travel through this canal and pay the toll of five cents per gross ton levied by the Port of New Orleans to go through the lock affording entrance to the river.

The Inner Harbor Navigation Canal (also called the Industrial Canal), constructed between 1918 and 1923, created a long-sought connection between Lake Pontchartrain and the Mississippi River. A lock was required at the Mississippi River end of the 5.5-mile-long canal to admit the waters of the river into the lower level of the canal. The state of Louisiana and the city of New Orleans constructed the Industrial Canal to cut off approximately 40 miles of water distance from New Orleans to the Gulf, to provide an inner harbor with leaseable waterfront property, and to furnish an indispensable link in the intracoastal canal by connecting the inland waterways lying to the east of the Mississippi River with those to the west.⁴³

As early as 1921, efforts were underway to induce the federal government to take over the canal so the lock could be freed of tolls and coastwise traffic of small craft could be encouraged. At the twenty-sixth annual convention of the Intracoastal Canal Association in November, 1930, Louisiana Senator Edwin S. Broussard called for the United States government to take over the Industrial Canal and to reimburse the state the \$20 million expended on its construction. Only a few months earlier, however, the Board of Engineers for Rivers and Harbors had rejected such a proposal. because the inland waterway traffic at that time did not justify federal takeover of the canal. Furthermore, incorporation of the Industrial Canal into the federal intracoastal waterway project had become caught up in another issue involving construction of an alternate deep-water outlet from the

Proposed New Lock and Connecting Channel for the Mississippi River-Gulf Outlet



Mississippi River to the Gulf, also not considered necessary at that time. The Chief of Engineers, Major General Lytle Brown, acknowledged the "prospective value" of the Industrial Canal as part of the inland waterway system, but he added that the extent of the private improvement exceeded that required by the inland waterway. Thus if the federal government chose to acquire this canal, Brown urged that it offer to pay only a portion of the total construction cost.⁴⁴

The wartime act passed in 1942 modified the inland waterway project to provide a new eastern approach to New Orleans. The modification involved a land cut through the marsh from the Rigolets to a point on the Industrial Canal, about 2.25 miles from the Mississippi River. The federal government agreed to lease that portion of the state-owned canal from the point where it was intersected by the intracoastal canal, through the lock, to the Mississippi River. This change eliminated passage through Lake Pontchartrain and five drawbridges, saving 30 miles in travel distance and offering the further advantage of easier, cheaper channel maintenance. Since the lease went into effect on April 1, 1944, this portion of the Industrial Canal has been operated by the United States government, free of tolls, representing the vital link between east and west in a continuous federal Gulf Intracoastal Waterway.⁴⁵

Unusual circumstances attended the lease agreement for the Industrial Canal. The 1944 lease arrangement with the Board of Commissioners of the Port of New Orleans (commonly known as the "Dock Board") was viewed as a temporary measure until the United States could acquire fee simple title to the canal facilities. Construction of the Industrial Canal had been financed by funds covered by bond issues; under the restrictions imposed by the bond indentures, the state could not relinquish any portion of the canal or lock before maturity of the bonds in 1960. Although these impediments to transfer of title were subsequently removed, the United States has never acquired this canal but continues to operate it as a link in the GIWW under the lease agreement, which has been renegotiated over the years to keep pace with inflation and escalating maintenance costs.⁴⁶

Shipping essential supplies for the war effort revived the issue of creating a more direct Mississippi River-Gulf Outlet (MR-GO) by making an alternate route to the Gulf appear somewhat more attractive in the interests of national defense than it had when viewed purely in economic terms. By 1946 the large and growing sea borne commerce of New Orleans provided economic justification for the improvement in the view of Major General Robert W. Crawford, Lower Mississippi Valley Division Engineer. Crawford also argued that the port capacity at New Orleans for emergency war service would be enhanced by an additional outlet and the resulting expansion of terminal facilities available for embarkation of defense-related personnel, material, and supplies.⁴⁷ Nevertheless, construction costs were estimated at a whopping \$67 million, economic justification remained qualified, and broad-based political backing was sorely needed to secure congressional authorization for the project. A decade later, far-reaching support together with a national climate favorable to transportation development convinced Congress that the proposed outlet

would not merely offer local benefits but would affect a large area of trade. Authorized finally in 1956, the MR-GO was opened to navigation in 1963. Although it is not actually part of the GIWW project, this artificial., deep-draft outlet runs 5.5 miles along the route of the eastern leg of the GIWW before turning southeast across the intervening marshlands to reach the Gulf.⁴⁸

The legislation authorizing the main MR-GO channel also dealt with the problem of the Industrial Canal Lock, which was becoming inadequate to handle the increasing volume of traffic through the New Orleans port. Specifically, the 1956 act provided for replacement of the existing lock at the Industrial Canal. or for construction of an additional lock in the vicinity of Meraux, east of New Orleans in St. Bernard Parish. Access from the Mississippi River to the inner tidewater area being developed as a " Centroport" at the juncture of the Industrial Canal. and the MR-GO required passage through the Industrial Canal Lock. Determining how to relieve the critical bottleneck at the antiquated lock involved approximately twenty years of bitter contrivers y. The powerful Dock Board, representing shipping and commercial interests, favored an alternate route (with ship lock) that would bisect St. Bernard Parish. Incensed residents and political leaders of this parish voiced strenuous objections. The alternative course, replacing the existing lock on the Industrial Canal, entailed enormous social, financial, and technical difficulties. The New Orleans Army Engineers found themselves caught in the midst of the heated dispute. Tempers flared over issues of local self-determination , political power, jurisdiction over the proposed channel, cost allocation, hurricane-flood protection, and projected social and ecological impact. In 1977, after literally much ado, President Jimmy Carter resolved the dilemma in a directive to the Corp of Engineers that removed the option of an alternate channel location. Within a year, the New Orleans Engineers were well into planning for replacement of the Industrial Canal Lock on its present site.⁴⁹

The desirability of alternate routes for the GIWW led in the middle 1940s to provision for two main connecting channels. A 9-mile-long route joining the western section of the inland waterway with the Mississippi River through a lock at Algiers, downstream from New Orleans, was authorized in 1945 and completed in 1956. This route diverted sane of the GIWW traffic away from the congested passage near New Orleans. The Morgan City-Port Allen route, authorized in 1946 and opened to navigation in 1961, offered a shorter course for traffic moving between the upper Mississippi and Ohio rivers and the western portion of the intracoastal waterway. This alternate route incorporated the earlier Plaquemine-Morgan City waterway and added the new lock at Port Allen, which replaced the older Plaquemine Lock as the point of entrance to the Mississippi River .5°

The last and extreme western segment in the main channel of the GIWW was charted through the Laguna Madre, a 150-mile-long, shallow body of water paralleling the coast from Corpus Christi to Brazos Santiago Pass (the pass between Brains and Padre islands, through which the channel to Brownsville rum). Separated from the Gulf by

Padre Island, the Laguna Madre itself forms two natural bays that are divided in the middle by an area of mud flats. Dredging of this final extension did not begin until the existing waterway had been enlarged to Corpus Christi. Operations began on December 12, 1945, as pipeline dredges started from Corpus Christi and from Port Isabel, working toward a meeting that would join the two sections of the Laguna Madre and mark the accomplishment of an undertaking far more vast. At the remote mud flats, the McWilliams dredge Caribbean moved north to meet the Standard Dredging Corporation dredge Miami. The final cut was made and the channel was opened on June 18, 1949, affording a continuous inland water route from Carrabelle, Florida to Brownsville, Texas.⁵¹

BRANCHING OUT

The main channel of the Louisiana and Texas Intracoastal Waterway had been seventy-five years in the making. Its completion, however, signifies only a portion of the total GIWW story. Subsequent improvements have involved various modifications and enlargements, relocation of channels, and the addition of many branch channels. As segments of the main channel were opened to navigation, commercial interests worked vigorously to establish tributary connections. Numerous rivers flowing into the Gulf crossed the GIWW and naturally became offshoots of it. Where nature failed to provide an existing stream, man could create an artificial channel. By 1961, almost ninety tributaries had been incorporated into the GIWW system, more than half of them in Louisiana and Texas.⁵²

The addition of each tributary channel enhances the value of the main channel while, in turn, linkage with the vast GIWW system endows a minor stream or out-of-the-way location with new commercial relevance. Many tributary channels provide outlets to the Gulf, making it easier for the oil industry to service offshore rigs by water and greatly benefiting shrimping and fishing fleets as well as waterborne trade in general. Other tributary channels reach inland and furnish water access to the hinterland. Some offer pathways to major industrial centers and provide water avenues along which raw materials can be shipped directly to the point of production. Still others may contribute to improved ecological balance, flood control, and drainage.

One example of tributary advantages can be seen at Port Mansfield, Texas. Situated 38 miles above Port Isabel on the lower part of the Laguna Madre, this isolated spot was known as "Red Fish Landing" until 1950. As the GIWW was extended to Brownsville, a tributary channel at Port Mansfield quickly was joined to it. During the 1950s, the Army Engineers dredged an artificial channel across Padre Island, giving Port Mansfield its own Gulf outlet. Prosperity at Port Mansfield (population 731) depends heavily upon commercial and sport fishing. Creation of the artificial inlet yielded benefits in addition to navigation. Opening of the channel improved tidal exchange, reducing salinity in the bay and thereby enabling it to support more marine life. Resulting ecological changes in the adjacent bay area have nurtured more abundant populations of redfish, brown shrimp, flounder, and spotted trout, as well as other saltwater species.⁵³

In contrast to the remote tributary at Port Mansfield are major deep-water channels leading to thriving ports in Corpus Christi, Freeport, Houston, Texas City, Galveston, Port Arthur, Beaumont, Orange, Lake Charles, Morgan City, Baton Rouge, and New Orleans. Their articulation with the GIWW has stimulated and facilitated enormous economic development and industrial expansion in these port communities . Each tributary channel adds to the dimension and magnitude of the remarkable inland waterway to which it is linked.

Since 1949 when through inland navigation was established between New Orleans and Brownsville, traffic has risen and commerce has increased dramatically. Cargoes include crude petroleum, fuel oil, petroleum products, marine shells for cement manufacturers , nonmetallic minerals, and chemicals. Figures for tonnage handled on the section of the GIWW between Galveston and the Louisiana border topped 46 million tons in 1972; on the main channel of the Louisiana section, they exceeded 70 million tons in 1971. These are spectacular statistics in the light of the 5-7 million tons estimated by Goethals as justification for constructing this western leg of the intracoastal waterway. ⁵⁴